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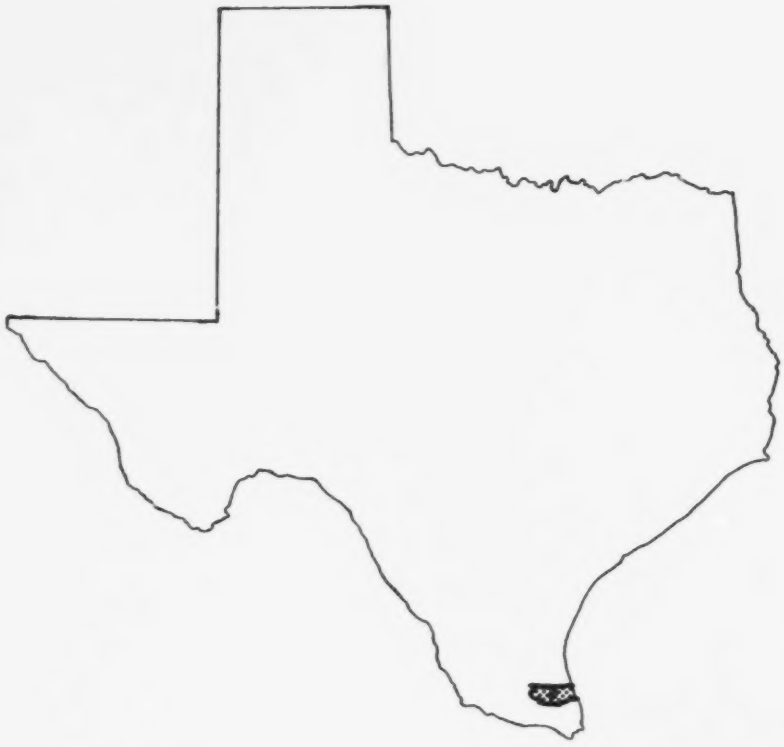
FLOOD INSURANCE STUDY

CITY OF RAYMONDVILLE, TEXAS
WILLACY COUNTY



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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
CITY OF RAYMONDVILLE, WILLACY COUNTY, TEXAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the City of Raymondville, Willacy County, Texas. This information will be used by the City of Raymondville to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Roy F. Weston, Inc., for the Federal Insurance Administration, under Contract No. H-4789. This study was completed in September 1979.

The Flood Insurance Rate Map for the City of Raymondville was revised by Dewberry & Davis to change the zone designation to more accurately reflect historical flooding data. This work was completed in February 1988.

1.3 Coordination

In May 1978, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the City of Raymondville, and Roy F. Weston, Inc. (the original study contractor), to select a community base map and to identify the streams to be studied by detailed methods. Intermediate project meetings with the study contractor and representatives of the city were held in March 1979 to discuss the project status and direction.

In addition to the meetings noted above, information and assistance related to the study were obtained from the Texas Department of Water Resources, the Soil Conservation Service (SCS), the U. S. Geological Survey (USGS), and the U. S. Army Corps of Engineers (COE). The consulting firm of Urban Engineering also provided significant input as the land surveying subcontractor for the project.

On April 25, 1980, the results of the study were reviewed at the final meeting attended by representatives of the study contractor, the FEMA, and community officials. The study was acceptable to the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Raymondville, Willacy County, Texas. The area of study is shown on the Vicinity Map (Figure 1).

Detailed methods of analyses were used to study these areas potentially subject to shallow flooding. The study limits were determined by FEMA with community and study contractor consultation at the meeting of May 1978, and include areas of projected development or proposed construction for the next five years, through May 1983.

This revision is based on the U. S. Army Corps of Engineers (COE), Galveston District Report on Hurricane Beulah, 8-21 (Reference 7). The zone designation to the east of the Missouri Pacific Railroad was changed from Zone AH (Elevation 33 Feet) to Zone AO (Depth 1 Foot).

2.2 Community Description

The City of Raymondville is located in the Lower Rio Grande Valley, in Willacy County, on the southern Texas Gulf Coast. The corporate limits occupy approximately 1,900 acres and is situated approximately 22 miles north of Harlingen, Texas, on U. S. Highway 77.

Development exists throughout the corporate limits with the bulk of new development occurring along the highway. According to the U. S. Census Bureau, the population of Raymondville decreased from 9,385 in 1960 to 7,987 in 1970 (Reference 1). This decrease was probably related to the closing of the Harlingen Air Force Base during that time period (Reference 2). The Lower Rio Grande Valley Development Council estimates the 1975 stable population of Raymondville to be 8,690 (Reference 3).

Low-density residential land use occupies over 63 percent of the total land areas within the city limits. Industrial/commercial land

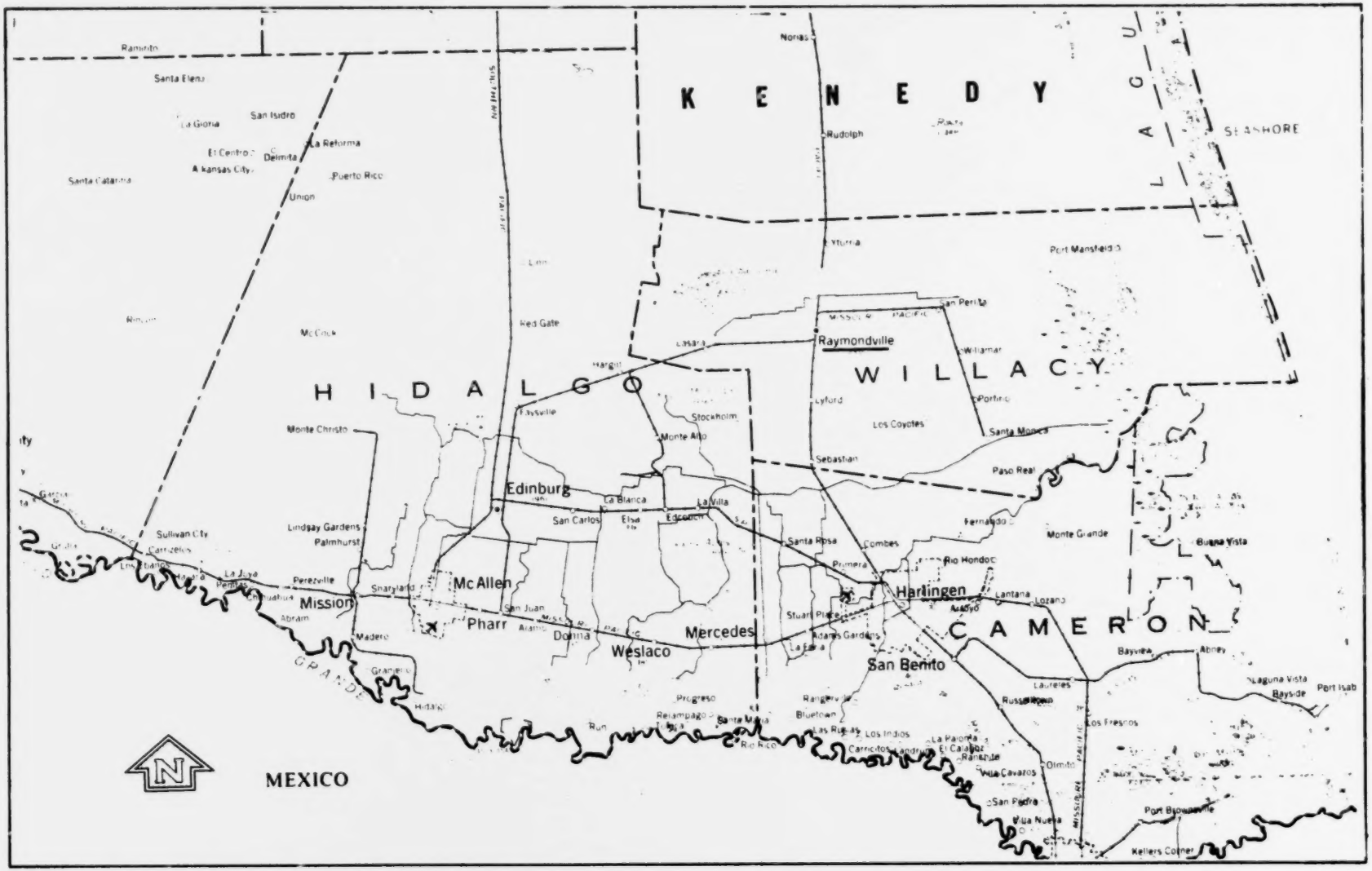

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RAYMONDVILLE, TX
(WILLACY CO.)

APPROXIMATE SCALE

16 0 16 32 48 MILES

VICINITY MAP

use is the second largest category accounting for 21 percent, followed by agricultural use at just over 7 percent. The remaining land uses are institutional, parks, and open spaces, and water areas (Reference 3).

The climate of Raymondville is subtropical with mean temperatures ranging from approximately 60 degrees Fahrenheit (^{o}F) in January to 85^{o}F in August. Rainfall averages from less than 1.0 inch in March and December to over 5.0 inches in September. Annual rainfall averages approximately 26 inches per year. Since 1953, the lowest annual precipitation recorded at Raymondville, was in 1954 when there was only 19.47 inches. The highest precipitation of 60.92 inches was recorded in 1960 (Reference 4).

Winds are predominately from the southeast for eleven months of the year. During December, the winds are predominately from the north. Wind velocities generally range from 8 to 11 miles per hour. Departures from this generally occur in late summer when hurricanes are active in the Gulf of Mexico and in December with the passing of continental air masses (Reference 5).

No rivers or major drainage channels exist in or immediately around the corporate limits. Drainage is impeded by a relatively flat topography. Throughout the county, the terrain slopes toward the Gulf of Mexico at about 1.0 foot per mile.

2.3 Principal Flood Problems

Flood-producing storms can occur at any time of the year. However, they occur most frequently during the spring and fall months. Small floods occur in some part of the county each year. These usually are caused by local storms of high intensity. Widespread flooding is associated with storms covering a large area and with heavy rainstorms that accompany hurricanes. Some of the more recent major floods occurred in 1955, 1957, and 1958, and 1961 (Hurricane Carla), and 1967 (Hurricane Beulah).

Flooding and subsequent flood damage is caused by ponding of excess water from rainfall in the area. Water tends to accumulate rather than run off because of the flat topography, lack of natural channels, and inadequate drainage systems.

Before the advent of irrigation farming, there were few barriers to surface flow, and excess rainfall moved slowly as sheet runoff into Laguna Madre. Irrigation canals, railroads, roads, and highways have been built across the basin in all directions. These manmade obstructions block natural flows and cause inundation of large areas. In some cases these restrictions cause water to stand for long periods, resulting in damage to property and loss of business.

Often schools are forced to close for several days until the water recedes. Flooding of sanitation facilities compounds the health hazard.

Flood problems in Willacy County are interrelated with those in Hidalgo County. Most of the surface runoff from Hidalgo County must flow through Willacy County to Laguna Madre. There are no natural channels in the area. The problem becomes even more acute when local floods coincide with floods on the Rio Grande and floodgates to the floodway system are closed (Reference 6).

The flood conditions described above were experienced in Raymondville in September 1967, as Hurricane Beulah hit the Lower Rio Grande Valley. Heavy rains accompanying the storm caused widespread flooding estimated by FEMA to be consistent with the 100-year recurring flood event.

Following Hurricane Beulah, major areas within the city limits of Raymondville were subject to shallow flooding conditions due to backup and ponding of runoff from the major drainage canal. A COE damage survey team noted debris/driftline elevation of approximately 33 feet above National Geodetic Vertical Datum (NGVD) of 1929 (Reference 7) west of the railroad tracks and 31 feet east of the tracks, as compared to normal ground elevations of 32 and 30 feet NGVD, respectively (Reference 8).

The Flood Insurance Rate Map (Exhibit 1) depicts the limits of flooding in Raymondville, Texas, resulting from Hurricane Beulah, as prepared by the COE following the flood event (Reference 7).

2.4 Flood Protection Measures

The City of Raymondville has no major structural facilities which can prevent or reduce flooding due to a major storm event. The city has spent a considerable amount of money, approximately $1,500,000 for capital improvements of the drainage facilities since the effects of Hurricane Beulah. Drainage projects included completion of the "Main Drain" north of the city, the Willacy County Drain east of the city, new drainage facilities in the northwest part of the city, and a general clean-up of existing ditches. These drainage improvements do not protect against flooding since the total drainage system is not capable of handling the significant volumes of stormwater associated with a major storm event. The capital improvements program has resulted in a drainage system that promotes more rapid recession of the flood water following the flood occurrence.

Other drainage improvements were evaluated by the SCS (Reference 9) and the COE (Reference 10). These improvements, if implemented, will increase the capacity of the major drainage channels in Willacy County. However a recent feasibility report released by the COE

(Reference 2) which is a continuation of the above studies, only considers actions along the Gulf Coast in areas subject to hurricane surges.

Since Hurricane Beulah, the City of Raymondville requires that all new building foundations be raised to the base flood elevation before a permit will be issued.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Detailed analyses were carried out to establish and delineate the extent of shallow flooding and ponding areas for floods of the selected recurrence interval. Field reconnaissance was incorporated with existing data and verification surveys to compute to the nearest whole foot, the depth of shallow flooding.

The Hurricane Beulah report (Reference 7) was accepted as initially depicting the areas of 100-year inundation. Field reconnaissance, interviews, local input, and other existing data provided further information of a more specific nature. These data, combined with recorded high-water marks and field surveys determined the actual and potential elevation of shallow flooding for the 100-year flood event.

The combined data was evaluated along with the existing Flood Hazard Boundary Map to identify flood hazard zone designations and base flood elevations or average depths of inundation, to the nearest whole foot, wherever applicable.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 2).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 100-year flood has been adopted by FEMA as the base flood for purposes of floodplain management measures. For the shallow flooding area studied, the boundaries of the 100-year flood have been delineated using the flood elevations determined during field surveys and interpolation of topographic maps at a scale of 1:24,000 with a contour interval of 5.0 feet (Reference 8). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. The concept of a floodway is not appropriate in shallow flooding and ponding areas.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the unincorporated areas of Willacy County, Texas (Reference 11). The results of this study are in complete agreement with the results of that study. A previously published report dealing with flood problems in the study area is the Hurricane Beulah report (Reference 7). Other studies discussing general flood problems in the area are included in the Bibliography and References section. This report is authoritative for purposes of the Flood Insurance Program and the data presented here either supersedes or are compatible with previous determinations.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Federal Regional Center, 800 North Loop 288, Denton, Texas 76201-3698.

9.0 BIBLIOGRAPHY AND REFERENCES

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4. The Dallas Morning News, Texas Almanac, 1978.

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6. B. L. Nelson & Associates, Inc., Comprehensive Plan for Water, Sewer, and Storm Drainage in tthe Lower Rio Grande Valley, September 1971.

7. U. S. Army Engineer District, Corps of Engineers, Report on Hurricane Beulah, 8-21 September 1967, Galveston, Texas, September 1968.

8. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 5 Feet: San Perlita North (1956); San Perlita South (1970).

9. Soil Conservation Service, Comprehensive Study and Plan of Development, Lower Rio Grande Basin, Texas, 1969.

10. U. S. Army Corps of Engineers, Public Information Brochure, Lower Rio Grande Basin, Texas, Flood Control and Major Drainage Project, 1977.

11. Federal Emergency Management Agency, Flood Insurance Study, Willacy County, Texas, Washington, D. C., February 25, 1984.

EXHIBIT 2 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 1	29.61	Approximately 150 feet southeast of intersection of Hidalgo Avenue and 13th Street.
RM 2	30.55	At intersection of 10th Street and Yturria Avenue.
RM 3	30.23	At intersection of 10th Street and East Norman Avenue.
RM 4	32.73	At intersection of Harris Avenue and 5th Street.
RM 5	31.99	At intersection of San Francisco Avenue and 2nd Street.